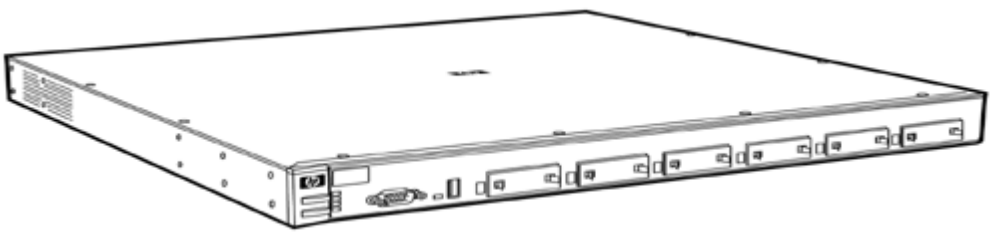
Overview

ProCurve Switch 6400cl



ProCurve Switch 6410cl

Models

ProCurve Switch 6400cl	J8433A
ProCurve Switch 6410cl	J8474A

Introduction

The ProCurve Switch 6400cl series consists of 6-port 10-GbE stackables with optional 10-GbE add-on modules. Loaded with full Layer 3 features, the 6400cl series switches offer low-cost 10-GbE for high-performance aggregation of clusters of Gigabit switches. Ideal for consolidating multiple wiring closets, the 6400cl series offers the highest bandwidth on the market today for Gigabit. The ProCurve Switch 6400cl series also provides fiber flexibility to connect remote campuses up to 40 km away.

Features and Benefits

- 160 Gbps backplane with 119 mpps: unprecedented bandwidth for low-latency throughput
- Layer 3 IP routing: provides routing of IP at media speed; supports static routes, RIP, RIPv2, and OSPF
- ProCurve switch meshing: dynamically load-balances across multiple active redundant links to increase available aggregate bandwidth
- Router redundancy (XRRP): allows groups of 2 routers to dynamically back each other up to create highly available routed environments
- IP multicast (data-driven IGMPv3): automatically prevents flooding of IP multicast traffic
- Spanning Tree Protocol (IEEE 802.1D): provides redundant links while preventing network loops
- 802.1w Rapid Convergence Spanning Tree Protocol: increases network uptime through faster recovery from failed links
- 802.1s Multiple Spanning Tree: provides high link availability in multiple VLAN environments by allowing multiple spanning trees
- Optional redundant power supply: provides uninterrupted power (provided by ProCurve 600 EPS/RPS)
- VLAN support and tagging: support complete 802.1Q (4,096 VLAN IDs) and 256 VLANs simultaneously
- Access control lists (ACLs): provide IP Layer 3 filtering based on source/destination IP address/subnet and source/destination TCP/UDP port number
- Port security: prevents unauthorized access using MAC address lockdown
- Source port filtering: allows only specified ports to communicate with each other
- Web-based authentication: similar to 802.1X, provides a browser-based environment to authenticate clients that do not support the 802.1X supplicant

Overview

- **802.1X and RADIUS network login:** control port-based access for authentication and accountability
- **TACACS+:** eases switch management security administration by using a password authentication server
- **Secure Shell** (SSHv2): encrypts all transmitted data for secure CLI remote access over IP networks
- **Secure Sockets Layer** (SSL): encrypts all HTTP traffic, allowing secure access to the browser-based management GUI in the switch
- **Layer 4 prioritization:** enables prioritization based on TCP/UDP ports
- **Traffic prioritization** (802.1p): allows real-time traffic classification into 8 priority levels mapped to 4 queues
- **Class of Service** (CoS): sets 802.1p priority tag based on IP address, IP Type of Service (ToS), L3 protocol, TCP/UDP port number, source port, and DiffServ
- **RMON, XRMON, and SMON:** provide advanced monitoring and reporting capabilities for statistics, history, alarms, and events
- **sFlow** (RFC 3176): wire-speed traffic accounting and monitoring
- **Group VLAN Registration Protocol** (GVRP): allows automatic learning and dynamic assignment of VLANs
- **802.1v Protocol VLANs:** isolate select non-IPv4 protocols automatically into their own VLANs
- **802.3ad Link Aggregation Control Protocol** (LACP) **and ProCurve trunking:** support up to 4 trunks, each with up to 4 links (ports) per trunk; trunking across modules is supported
- **Rate limiting:** per-port ingress enforced maximums and per-port, per-queue guaranteed minimums
- **Jumbo frames:** on Gigabit and 10-Gigabit ports, allows high-performance remote backup and disaster recovery services
- **Secure access to manage the 6400cl series:** all access methods-CLI, GUI, or MIB-are securely encrypted through SSHv2, SSL, and/or SNMPv3
- **Secure FTP:** allows secure file transfer to/from the switch-protects against unwanted file downloads or unauthorized copying of switch configuration file
- **Optional redundant power supply:** provides uninterrupted power (provided by ProCurve 600 RPS/EPS)
- **Stacking capability:** single IP address management for a virtual stack of up to 16 switches, including the ProCurve 2500 series, 2600 series, 2800 series, 3400cl series, 6108, 6400cl series, and 4100gl series
- **Lifetime warranty:** for as long as you own the product, with next-business-day advance replacement (available in most countries)

Services

ProCurve Switch 6400cl	3-year, 4-hour onsite, 13x5 coverage for hardware	UA438A/E
	3-year, 4-hour onsite, 24x7 coverage for hardware	UA439A/E
	Installation with minimum configuration, system-based pricing	U4826A/E
	Installation with HP-provided configuration, system-based pricing	U4830A/E
	Installation with HP-provided configuration, system-based pricing	UA440A/E
ProCurve Switch 6410cl	3-year, 4-hour onsite, 13x5 coverage for hardware	UA438A/E
	3-year, 4-hour onsite, 24x7 coverage for hardware	UA439A/E
	Installation with minimum configuration, system-based pricing	U4826A/E
	Installation with HP-provided configuration, system-based pricing	U4830A/E
	Installation with HP-provided configuration, system-based pricing	UA440A/E

Check www.hp.com/go/procurveservices for part numbers and service-level descriptions. For details about services and response times in your area, please contact your local HP sales office.

Technical Specifications

ProCurve Switch 6400cl (J8433A)	Ports	6 CX4 10-GbE ports; 1 RS-232C DB-9 console port	
		Maximum ports	Supports a maximum of 8 10-GbE ports
	Cabling	CX4 ports Maximum distance: 0.5 m to 15 m using CX4 cable Up to 300 m using J8439A media converter using MMF	
	Physical characteristics	Dimensions	16.9 x 17.4 x 1.7 in. (42.93 x 44.2 x 4.32 cm) (1U height)
		Weight	12.35 lb. (5.60 kg)
	Memory and processor	Fabric processor type and speed	Motorola PowerPC MPC8245 @ 266 MHz
		SRAM	128 MB
		Flash ROM	128 MB
		Packet buffer size	4 MB
		Flash	16 MB
		Flash capacity	Dual flash
	Mounting	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only	
	Performance	Latency	<11.7 μs (LIFO 64-byte packets)
		Throughput	Up to 119 million pps (64-byte packets)
		Routing/Switching capacity	160 Gbps
		Routing table size	16,000 entries
	Environment	Operating temperature	32° to 131°F (0° to 55°C); 104°F (40°C) when used with SR/LR/ER optics)
		Operating relative humidity	15% to 95% at 104°F (40°C), non-condensing
		Non-operating/ Storage temperature	–40° to 158°F (–40° to 70°C)
		Non-operating/ Storage relative humidity	15% to 95% at 149°F (65°C), non-condensing
		Altitude	Up to 15,091 ft. (4.6 km)
		Acoustic	DIN 45635T.19 per ISO 7779 55dB @ <77°F (25°C)
	Electrical characteristics	Maximum BTUs	383 BTU/hr, including use of optional cl modules with optics
		Voltage	100-127 VAC/200-240 VAC
		Current	3 A/1.5 A
		Power consumption	112 W
		Frequency	50/60 Hz
	Safety	CSA 22.2 No. 60950; EN 60950/IEC 60950; UL 60950	
	Emissions	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A	

Immunity	EN	EN 55024/CISPR 24
	ESD	IEC 61000-4-2, 4kV CD, 8kV AD
	Radiated	EN 61000-4-3, 3 V/m
	EFT/Burst	EN 61000-4-4, 1.0 kV (power line), 0.5 kV (signal line)
	Surge	EN 61000-4-5, 1kV/2kV AC
	Conducted	EN 61000-4-6, 3 V
	Power frequency magnetic field	IEC 61000-4-8, 1A/m, 50 or 60 Hz
	Voltage dips and interruptions	IEC 61000-4-11, >95% reduction, 0.5 period; 30% reduction, 25 periods
	Harmonics	EN 61000-3-2/IEC 61000-3-2
	Flicker	EN 61000-3-3/IEC 61000-3-3
Management	ProCurve Manager (included); ProCurve Manager Plus; command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	
Standards and protocols	RFC 783 TFTP; RFC 951 BootP; RFC 1542 BootP; RFC 854 Telnet; RFC 768 UDP; RFC 792 ICMP; RFC 793 TCP; RFC 826 ARP; RFC 2030 Simple Network Time Protocol; IEEE 802.3X Flow Control; DHCP Relay; RFC 3376 IGMPv1/v2/v3; RFC 2453 RIPv2; RFC 2328 OSPFv2 (includes route authentication); IEEE 802.1D Spanning Tree; IEEE 802.1w Rapid Convergence Spanning Tree; IEEE 802.1s Multiple Spanning Trees; IEEE 802.3ad Link Aggregation Control Protocol; IEEE 802.1AB Link Layer Discovery Protocol; RFC 2474 DiffServ Precedence; RFC 2598 DiffServc Assured Forwarding (AF); RFC 1492 TACACS+; RFC 2138 RADIUS; RFC 2866 RADIUS accounting; SSHv1/SSHv2 Secure Shell; Secure Sockets Layer (SSL); IEEE 802.1X Network Login; IEEE 802.1Q VLANs; IEEE 802.1Q VLAN tagging; IEEE 802.1v VLAN Classification by Protocol and Port; IEEE 802.1Q GVRP; IEEE 802.1p Priority; SNMPv1/v2c/v3; HTML and telnet management; RFC 1493 Bridge MIB; RFC 1213 MIB II; RFC 2096 IP Forwarding Table MIB; RFC 2863 Evolution of Interface; RFC 2665 Ethernet MIB; RFC 1058 RIP; RFC 1724 RIPv2 MIB; RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm), and 9 (events); RFC 3164 Syslog; XRMON; sFlow; RFC 2668 802.3 MAU MIB; RFC 2613 SMON; RFC 2674 802.1p and IEEE 802.1Q Bridge MIB; RFC 1850 OSPF MIB; RFC 2618 RADIUS Client MIB; RFC 2620 RADIUS Accounting MIB; IEEE 802.3ae 10-Gigabit Ethernet; IEEE 802.3ak 10-Gigabit Ethernet	

Technical Specifications

ProCurve Switch 6410cl (J8474A)	**Ports**		6 10-GbE ports; 1 RS-232C DB-9 console port
		Maximum ports	Supports a maximum of 8 10-GbE ports
	Cabling	**X2 transceiver slots**	ProCurve 10-GbE X2-SC LR Optic: Maximum distance: 9/125 µm single-mode cable = 2-10 km ProCurve 10-GbE X2-SC SR Optic: Maximum distance: • 62.5 µm multimode cable @ 160 MHz/km = 2–26 meters • 62.5 µm multimode cable @ 200 MHz/km = 2–33 meters • 50 µm multimode cable @ 400 MHz/km = 2–66 meters • 50 µm multimode cable @ 500 MHz/km = 2–82 meters • 50 µm multimode cable @ 2000 MHz/km = 2–300 meters ProCurve 10-GbE X2-SC ER Optic: Maximum distance: 30 km (40 km using engineered link) Available Summer 2005 ProCurve 10-GbE X2-CX4 Transceiver: 0.5 m to 15 m using CX4 cable Up to 300 m using J8439A media converter using MMF
	Physical characteristics	**Dimensions**	16.9 x 17.4 x 1.7 in. (42.93 x 44.2 x 4.32 cm) (1U height)
		Weight	13.56 lb. (6.1 kg)
	Memory and processor	**Fabric processor type and speed**	Motorola PowerPC MPC8245 @ 266 MHz
		SRAM	128 MB
		Flash ROM	128 MB
		Packet buffer size	4 MB
		Flash	16 MB
		Flash capacity	Dual flash
	Mounting		Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only
	Performance	**Latency**	<11.7 µs (LIFO 64-byte packets)
		Throughput	Up to 119 million pps (64-byte packets)
		Routing/Switching capacity	160 Gbps
		Routing table size	16,000 entries

Technical Specifications

Environment	Operating temperature	32° to 131°F (0° to 55°C); 104°F (40°C) when used with SR/LR/ER optics)
	Operating relative humidity	15% to 95% at 104°F (40°C), non-condensing
	Non-operating/ Storage temperature	–40° to 158°F (–40° to 70°C)
	Non-operating/ Storage relative humidity	15% to 95% at 149°F (65°C), non-condensing
	Altitude	Up to 15,091 ft. (4.6 km)
	Acoustic	DIN 45635T.19 per ISO 7779 55dB @ <77°F (25°C)
Electrical characteristics	Maximum BTUs	383 BTU/hr, including use of optional cl modules with optics
	Voltage	100-127 VAC/200-240 VAC
	Current	3 A/1.5 A
	Power consumption	112 W
	Frequency	50/60 Hz
Safety	CSA 22.2 No. 60950; EN 60950/IEC 60950; UL 60950	
Emissions	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A	
Immunity	EN	EN 55024/CISPR 24
	ESD	IEC 61000-4-2, 4kV CD, 8kV AD
	Radiated	EN 61000-4-3, 3 V/m
	EFT/Burst	EN 61000-4-4, 1.0 kV (power line), 0.5 kV (signal line)
	Surge	EN 61000-4-5, 1kV/2kV AC
	Conducted	EN 61000-4-6, 3 V
	Power frequency magnetic field	IEC 61000-4-8, 1A/m, 50 or 60 Hz
	Voltage dips and interruptions	IEC 61000-4-11, >95% reduction, 0.5 period; 30% reduction, 25 periods
	Harmonics	EN 61000-3-2/IEC 61000-3-2
	Flicker	EN 61000-3-3/IEC 61000-3-3
Management	ProCurve Manager (included); ProCurve Manager Plus; command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	

Standards and protocols	RFC 783 TFTP; RFC 951 BootP; RFC 1542 BootP; RFC 854 Telnet; RFC 768 UDP; RFC 792 ICMP; RFC 793 TCP; RFC 826 ARP; RFC 2030 Simple Network Time Protocol; IEEE 802.3X Flow Control; DHCP Relay; RFC 3376 IGMPv1/v2/v3; RFC 2453 RIPv2; RFC 2328 OSPFv2 (includes route authentication); IEEE 802.1D Spanning Tree; IEEE 802.1w Rapid Convergence Spanning Tree; IEEE 802.1s Multiple Spanning Trees; IEEE 802.3ad Link Aggregation Control Protocol; IEEE 802.1AB Link Layer Discovery Protocol; RFC 2474 DiffServ Precedence; RFC 2598 DiffServc Assured Forwarding (AF); RFC 1492 TACACS+; RFC 2138 RADIUS; RFC 2866 RADIUS accounting; SSHv1/SSHv2 Secure Shell; Secure Sockets Layer (SSL); IEEE 802.1X Network Login; IEEE 802.1Q VLANs; IEEE 802.1Q VLAN tagging; IEEE 802.1v VLAN Classification by Protocol and Port; IEEE 802.1Q GVRP; IEEE 802.1p Priority; SNMPv1/v2c/v3; HTML and telnet management; RFC 1493 Bridge MIB; RFC 1213 MIB II; RFC 2096 IP Forwarding Table MIB; RFC 2863 Evolution of Interface; RFC 2665 Ethernet MIB; RFC 1058 RIP; RFC 1724 RIPv2 MIB; RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm), and 9 (events); RFC 3164 Syslog; XRMON; sFlow; RFC 2668 802.3 MAU MIB; RFC 2613 SMON; RFC 2674 802.1p and IEEE 802.1Q Bridge MIB; RFC 1850 OSPF MIB; RFC 2618 RADIUS Client MIB; RFC 2620 RADIUS Accounting MIB; IEEE 802.3ae 10-Gigabit Ethernet; IEEE 802.3ak 10-Gigabit Ethernet

Modules and RPS

ProCurve Switch cl 10-GbE Media Flex Module (J8435A) 10-Gigabit module with 2 X2 transceiver slots	**Ports**	2 open transceiver slots Duplex: full
	Physical characteristics	Dimensions: 6.8125 x 4.5 x 1.6 in. (17.3 x 11.43 x 4.06 cm) Weight: 0.64 lb. (0.29 kg)
	Environment	Operating temperature: 32° to 131°F (0° to 55°C); 104°F (40°C) when used with SR/LR/ER optics Operating relative humidity: 15% to 95%, non-condensing Non-operating/Storage temperature: –40° to 158°F (–40° to 70°C) Non-operating/Storage relative humidity: 15% to 95% @ 149°F (65°C), non-condensing
	Transceivers supported (ordered separately)	• J8436A ProCurve 10-GbE X2-SC SR Optic • J8437A ProCurve 10-GbE X2-SC LR Optic • J8438A ProCurve 10-GbE X2-SC ER Optic • J8440A ProCurve 10-GbE X2-CX4 Transceiver
	Cabling	Type: 10Gbase-LR serial 1310 nm long haul (up to 10 km on single-mode fiber (SMF) Maximum distance: 10 km
ProCurve Switch cl 10-GbE CX4 Copper Module (J8434A)	**Ports**	2 10-Gigabit Ethernet ports (IEEE 802.3ak Type 10Gbase-CX4 transceiver) Duplex: full
	Physical characteristics	Dimensions: 6.81 x 4.5 x 1.5 in. (17.3 x 11.43 x 3.81 cm) Weight: 0.67 lb. (0.3 kg)
	Environment	Operating temperature: 32° to 131°F (0° to 55°C) Operating relative humidity: 15% to 95%, non-condensing Non-operating/Storage temperature –40° to 158°F (–40° to 70°C) Non-operating/Storage relative humidity: 15% to 95% @ 149°F (65°C), non-condensing
	Cabling	Maximum distance: • 15 m using CX4 cable • 300 m using optical media converters and multimode fiber cable Use CX4 10-GbE cable (0.5-15 m) or ProCurve 10-GbE CX4 Media Converter (J8439A).
ProCurve Switch cl 10-GbE X2-CX4 Transceiver (J8440A) 10-Gigabit X2 transceiver that supports a CX4 connector with distance of 15 m	**Port**	Connector: CX4 Duplex: full
	Physical characteristics	Dimensions: 3.54 x 1.42 x 0.53 in. (8.99 x 3.61 x 1.35 cm) Weight: 0.18 lb. (0.08 kg)
	Environment	Operating temperature: 32° to 131°F (0° to 55°C) Operating relative humidity: 15% to 95% @ 149°F (65°C), non-condensing
	Cabling	Maximum distance: • 15 m using CX4 cables • 300 m using optical media converters and multimode fiber cable Use CX4 10-GbE cable (0.5-15 m) or ProCurve 10-GbE CX4 Media Converter (J8439A).

Modules and RPS

ProCurve 10-GbE CX4 Media Converter (J8439A) Optical media converter for CX4 (10G copper) mmf cable up to 300 m	**Port**	Duplex: full
	Cabling	Type: 12 fiber 62.5/125 μm (core/cladding) diameter or 12 fiber 50/125 μm diameter, multimode ribbon cable with MPO/MTP to MPO/MTP connectors Maximum distance: • 62.5 μm multimode cable @ 150 MHz/km = 1–50 meters • 50 μm multimode cable @ 500 MHz/km = 1–100 meters • 50 μm multimode cable @ 2000 MHz/km = 1–300 meters
ProCurve 10-GbE X2-SC SR Optic (J8436A) Transceiver that supports 10G SR fiber standard; supports standard 50 u and 62.5 u mmf up to 300 m	**Ports**	1 10-Gigabit Ethernet port (IEEE 802.3ae Type 10Gbase-SR 850 nm serial optics) Connector: SC Duplex: full
	Physical characteristics	Dimensions: 3.48 x 1.42 x 0.43 in. (8.84 x 3.61 x 1.09 cm)
	Environment	Operating temperature: 32° to 104°F (0° to 40°C) Operating relative humidity: 15% to 95%, non-condensing
	Cabling	Type: 62.5 um (core/cladding) diameter or 50 um, 850 nm, low metal content, multimode fiber-optic, complying with the ITU-T G.652 and ISO/IEC 793-2 Type B1 standards Maximum distance: • 62.5 μm multimode cable @ 160 MHz/km = 2–26 meters • 62.5 μm multimode cable @ 200 MHz/km = 2–33 meters • 50 μm multimode cable @ 400 MHz/km = 2–66 meters • 50 μm multimode cable @ 500 MHz/km = 2–82 meters • 50 μm multimode cable @ 2000 MHz/km = 2–300 meters
ProCurve 10-GbE X2-SC LR Optic (J8437A) 10-Gigabit X2 transceiver that supports LR distance of 10 km with SC connector	**Ports**	1 10-Gigabit Ethernet port (IEEE 802.3ae Type 10Gbase-LR 1310 nm serial optics) Connector: SC Duplex: full
	Physical characteristics	Dimensions: 3.48 x 1.42 x 0.43 in. (8.84 x 3.61 x 1.09 cm) Weight: 0.16 lb. (0.07 kg)
	Environment	Operating temperature: 32° to 104°F (0° to 40°C) Operating relative humidity: 15% to 95%, non-condensing
	Cabling	Type: 9/125 μm (core/cladding) diameter, 1480 nm, low metal content, single-mode fiber-optic cables, complying with the ITU-T G.652 and ISO/IEC 793-2 Type B1 standards Maximum distance: 9/125 μm single-mode cable = 2 m–10 km
	Conditioning patch cord cables are not supported.	

Modules and RPS

ProCurve 10-GbE X2-SC ER Optic (J8438A)	**Ports**	1 10-Gigabit Ethernet port (IEEE 802.3ae Type 10Gbase-ER 1550 nm serial optics) Connector: SC Duplex: full
Supports the 10G ER standard. Supports 9u single-mode fiber up to 40 km.*	**Cabling**	Maximum distance: 30 km*

NOTE: Conditioning patch cord cables are not supported.
NOTE: Available Summer 2005.
*NOTE: Maximum distance 40 km using engineered link.

Additional accessories	ProCurve 600 Redundant External Power Supply (See the ProCurve 600 Redundant External Power Supply QuickSpecs for details.)	J8168A

Services for accessories are covered under the product in which they are installed.

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